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| 10/027,616      | 12/21/2001  | Vesselin Nikolov Shanov | 8782                | 2994             |

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THE PROCTER & GAMBLE COMPANY  
INTELLECTUAL PROPERTY DIVISION  
WINTON HILL TECHNICAL CENTER - BOX 161  
6110 CENTER HILL AVENUE  
CINCINNATI, OH 45224

EXAMINER

PADGETT, MARIANNE L

ART UNIT PAPER NUMBER

1762

DATE MAILED: 03/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/027,616

Applicant(s)

Shenou et al

Examiner

M.L. Padgett

Group Art Unit

1762

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

☒ Responsive to communication(s) filed on 6/3/02 + 6/27/03 + 2/25/02

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

☒ Claim(s) 1-20 is/are pending in the application.

Of the above claim(s) 1-12 and 19-20 is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 13-18 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement

## Application Papers

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119 (a)-(d)

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

☐ All ☐ Some\* ☐ None of the:

☐ Certified copies of the priority documents have been received.

☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_

☐ Copies of the certified copies of the priority documents have been received

in this national stage application from the International Bureau (PCT Rule 17.2(a))

\*Certified copies not received: \_\_\_\_\_

## Attachment(s)

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). (2/25/02)(6/3/02) + 8/18/03 ☐ Interview Summary, PTO-413

☒ Notice of Reference(s) Cited, PTO-892

☐ Notice of Informal Patent Application, PTO-152

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Other \_\_\_\_\_

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1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-12 and 19-20, drawn to a microwave plasma apparatus, potentially for atmosphere pressure surface treatment, classified in class 118, subclass 723 ME.
  - II. Claims 13-18, drawn to a microwave remote plasma process, for surface treatment potentially at atmosphere pressure, classified in class 427, subclass 562.

2. The inventions are distinct, each from the other because:

Inventions Group II and Group I are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process (MPEP § 806.05(e)). In this case the process requires the treatment of a substrate, while the apparatus has no necessary structure related to work piece treatment. Also, the process requires the working gas to by pass the inlet to the plasma gas input, while the apparatus requires no such structure. Also, the desire for preventing “deleterious interactions ...” of the gases may be purely a process limitation, such as when achieved by means of appropriate chemical reagent selection or process parameters.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

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Because these inventions are distinct for the reasons given above and the search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Larry Huston on August 13, 2003 a provisional election was made with traverse to prosecute the invention of Group II, process, claims 13-18. Affirmation of this election must be made by applicant in replying to this Office action. Claims 1-12 and 19-20 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

6. Claims 13-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Use of relative terms that lack clear metes and bounds in the claims, or a clear definition in the specification or cited relevant prior art, is vague and indefinite. In claim 13, see "minimal deterioration in lines 16 and 17. What degree of "deterioration" is more than minimal, and how does this not exclude the creation of "excited species" required in line 18? Does this mean that none of the excited species from the working gas are fragments of the working gas, or missing any atoms from the original molecules, i.e. only have energy added, but no change in molecular

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structure, or may some of the excited species be radicals of some variety. How much deterioration is minimal or what does excited species include and exclude?

In the last line of claim 13, “ambient” in “ambient pressure” is relative, because while some people will read this to mean atmospheric pressure, others will read it to mean whatever pressure happens to be in the location where the substrate is, whether its controlled, reduced, etc., or not.

In claim 18, the redefinition of “working gas” to apparently include the function of the plasmas gas, i.e., as “a source for generating said plasma”, is confusing, because in lines 15-17 of claim 13, the working gas is excluded (i.e., bypasses) the site where the plasma gas is input, such that it has minimal contact with the plasma, so how can it then generate the plasma with which it has little contact? This does not make sense in the context of the independent claim. Note while the working gas could include a carrier gas, such as Ar, which is the same type of gas as what is used for the plasma gas, it would not be involved in the plasma generation, as it is excluded from the area. It is something like that, what was intended by claim 18?

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 13-15 and 18 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Leutsch et al.

As discussed above, there are a number of uncertainties in the claims as written. One being that whatever the intended scope of "approximately ambient pressure", due to its variety of possible meanings, it can be taken as whatever pressure is used. However, Leutsch et al teach use of either vacuum or atmosphere pressure. Another uncertainty is input of the working gas, which as intended to by pass contact with plasma in one limitation, but be a source for its generation in another. Leutsch et al teach a plasma cleaning, activating and coating process, that may use RF, HF or microwave frequencies, teaching a preference for 2.45 GHz, and inputting a plasma gas (36) to be employed in the formation of plasma, but monomer gases used for coating are input just before the plasma exits the plasma source (20) chamber at nozzle 38, so that the monomer is added in the cooler regions of the plasma and not fragmented into its atomic components. This appears to satisfy possibilities for applicant's somewhat contradictory claim

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language. See the abstract; figures 1-2; column 3, lines 24-30 and 49- column 4, line 53, esp. 11, and 17-20; column 5, lines 63- column 6, lines 9 and 50-67+.

9. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Leutsch et al alone, or in view of Schuurmans et al or Geittner et al.

Leutsch et al do not specify what the plasma gases may be, nor use of an inert gas therefore, however inert gases are conventional plasma gases, hence would have been obvious to one of ordinary skill for their typical usage, with expected effectiveness. Alternately, see either Schuurmans et al (abstract; Fig. 1; Summary, esp. column 1, line 64- column 2, line 34; column 3, esp. lines 20-26) or Geittner et al (Figures 2 and 3; column 2, lines 1-8 and 17-21; and Ex. 2-3), who each may employ inert gases in atmosphere pressure microwave plasmas that form plasma stream. Therefore, it would have been further obvious to one of ordinary skill that inert gases were known to be effective in analogous plasma conditions, thus further motivating their use.

10. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Leutsch et al as applied to claims 13-15 and 18 above, and further in view of Roth (6,406,759 B1).

Leutsch et al teach the relative movement between the plasma apparatus and substrates, but does not teach that it may be the apparatus itself which is moved, being directed to very specific use on relatively small articles, i.e. wiper blades, where it would be wasteful to move the larger object, rather than the much smaller one. However, Roth who is teaching a broad variety of uses for atmosphere plasma processes (abstract; column 4, line 9- column 5, line 27), including cleaning functions and gas (CVD) coating processes, suggests portable remote exposure apparatus, and that his flow controls may be used with alternative plasmas from his

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OAUDG (glow discharge) plasma (column 6, lines 5-13+ and 40-48; Fig. 7). Therefore, it would have been obvious to one of ordinary skill that there are many functions other than wiper blades for which atmosphere plasma are desirable treatments, and those include ones where portability of the apparatus is suggested, hence motivating accommodations for portability as taught in Roth (759).

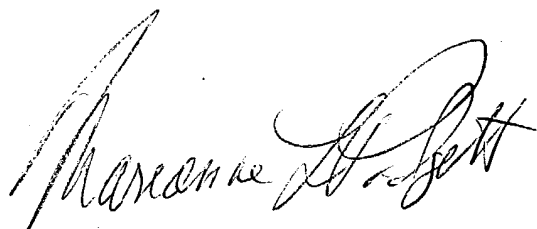
11. Bowers provides an alternate disclosure for moving the atmospheric plasma, in the case plasma teaches with respect to the substrate (abstract, figures, column 3, lines 43-54), thus in cumulative to the above rejection or an alternative to Roth's teachings.

Sugiyama et al is of interest for teaching another remote atmospheric pressure microwave plasma. Cohen et al, cited by applicant is noted to have a microwave plasma torch/flow configuration similar to Geittner et al.

12. Any inquiry concerning this communication should be directed to Marianne L. Padgett whose telephone number (571) 272-1425 on Monday-Friday from about 8:30 a.m. to 4:30 p.m.; and fax phone number is (703) 872-9306.

M.L. Padgett/dh  
March 12, 2004

March 23, 2004



MARIANNE PADGETT  
PRIMARY EXAMINER